

# 2800 Series Magnetic Flowtubes

Flowmeter flourishes in demanding fertilizer application

## Summary

Foxboro 2800 Series magnetic flowtubes measure the volumetric flow rate of virtually any conductive liquid and are designed to operate in harsh in-plant and outdoor environments.

## Business Value

Foxboro flowtubes have performed tens of thousands of service hours without requiring repair or maintenance. With the Foxboro transmitter's advanced electronics measurement accuracy is improved and provides reliable communications with remote control systems, thus ensuring accuracy and reliability while reducing maintenance costs.



## About the 2800 Series Magnetic Flowtubes

Foxboro® 2800 Series magnetic flowtubes measure the volumetric flow rate of virtually any conductive liquid. Designed to operate in harsh in-plant and outdoor environments, these flowtubes are weatherproof as defined by IEC IP65 and provide NEMA Type 4X environmental and corrosion resistance. The Foxboro 2800 Series is also available for use in total/accidental submergence installations in up to 9 meters or 30 feet of water, as well as applications involving cold process temperatures and warm ambient environments, where high humidity and condensate can create problems.

## Benefits

- Long-term service life in highly corrosive application
- Reliable performance to comply with environmental regulations
- Reduced maintenance and equipment costs
- Improved flow measurement accuracy
- Scalable communications with remote control system

### Technical Challenge

While potassium is one of the three primary agricultural nutrients, it is not adequately present in all soils. To compensate, many countries throughout the world rely on a potassium-rich mined substance called potash (potassium chloride) to achieve high yield, high-volume agricultural production. However, in its natural state, potassium chloride is intermingled with sodium chloride, more commonly known as salt. Separating the potash from the salt requires costly industrial processes that can impact production, profitability, and the environment.

Typically, potash is separated from salt through a multiphase process that involves scrubbing the raw material in a bath of brine, chlorine, and other chemicals that do not dissolve potassium. This highly corrosive solution is subject to strict environmental regulation and requires constant monitoring with exposed instrumentation. While marine-grade products have been tested in this application, they were corroded by the brine solution.

To keep the brine pond at a safe level, one of the world's largest providers of mined potash developed a government-approved process that disposes of the brine by pumping it underground. This is a closely regulated procedure whereby approximately 1,000 gallons per minute of the brine solution are injected 5,000 to 8,000 feet underground with 1,200 to 1,300 pounds of pressure. This extremely demanding application must be monitored closely to comply with government regulations, which require accurate measurement and documentation of the amount of brine that is buried.

For over 30 years, this company has met this requirement with a single instrument; the 2800 magnetic flowtube developed and built on Foxboro technology.

### The Foxboro Solution

As part of the potash producer's ongoing efforts to exceed environmental safety regulations voluntarily, they have upgraded or replaced many of the system's components. However, the Foxboro flowtube, which is the heart of the system, has performed without a glitch. The company reports that it has never had to return the Foxboro flowtube for updating or rebuilding. In fact, during a recent routine pipeline maintenance inspection, the company noted that the flowtube's neoprene liner still looked brand new.

The decision to use Foxboro magnetic flowmeters dates back to 1974. At the time, rotary meters were used to measure brine flow, but could not withstand the demands of the application. To improve measurement accuracy and reduce maintenance and equipment costs, the company reviewed available options with particular interest in magnetic flow measurement technology.

Foxboro was the only supplier at the time that could provide a magnetic flowmeter with a neoprene lining. While Teflon-coated flowtubes were available, they did not offer the abrasion resistance required for this application, and were more expensive. Foxboro magnetic flowtubes can measure the volumetric flow rate of virtually any conductive liquid, are designed to operate in harsh outdoor or in-plant environments, and constructed of 300 Series stainless steel.

Foxboro flowtubes also offer electrode configurations to maximize efficiency. The standard flat electrode is available in 316 stainless, Hastelloy C, tantalum-tungsten, titanium, or platinum. For applications where fluids can cause coatings to deposit on the sensing surface, Foxboro offers conical head self-cleaning electrodes.

With Foxboro flowtubes longevity and brine at the potash producer (mentioned above), government regulations requiring consistent, reliable measurement and reporting prompted an upgrade to an intelligent transmitter. Once again, Foxboro provided the solution, this time with the Foxboro IMT96 transmitter.

While company engineers were confident that the Foxboro transmitter could be easily installed, they were not sure about the communications. Their application involved analog communications with a 4-20 mA signal, transmitted to a control system three-quarters of a mile away. Initially, they were concerned about the compatibility of a state-of-the-art intelligent transmitter with a vintage flowtube. However, once installed and turned on, their concerns were mitigated. The signal came through loud and clear.

## Results

The Foxboro flowtube has performed tens of thousands of service hours without requiring repair or maintenance. The potash producer has not had to incur the expense of replacement flowtubes, while always being in full compliance with government regulations.

With additional benefits still expected, the customer views the Foxboro flowtube as almost invincible, with no sign of wear.

The upgraded intelligent transmitter has improved measurement accuracy and provides reliable communications with the company's remote control system. According to the company, the Foxboro transmitter's advanced electronics have reduced the frequency of calibration, thus ensuring accuracy and reliability while reducing maintenance costs.

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